

DETAILED ACTION

Notice to Applicant(s)

1. This office action is responsive to the amendment filed on 11/12/10. Claims 1-9, and 12-36 are pending.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 28, 30-31, and 33-36, are rejected under 35 U.S.C. 102(b) as being anticipated by Bridges (4848791).

As per claim 28, Bridges discloses a steering device for vehicles including a steering shaft, the steering device comprising: a housing defining a fluid filled pressure chamber; steering shaft comprising a steering rack driven from a pinion (see columns 3-4, lines 46-3); steering shall extending through the pressure chamber and having respective ends thereof at opposed sides of the pressure chamber (see column 2, lines 34-54); pinion disposed outside of said pressure chamber adjacent one end thereof (see columns 2-3, lines 55-15); coded microstructures disposed on the steering shaft and/or on a device that is connected to the steering shaft (see column 2, lines 34-54); a sensor for determining the movement of said steering shaft; sensor positioned for detecting the coded microstructures and outputting an associated measurement signal (see columns 4-5, lines 56-8); and a circuit for evaluating the measuring signal from the

sensor; circuit receiving the measurement signal and outputting an electronic signal representing a steering condition (see columns 5-6, lines 9-27).

As per claim 30, Bridges discloses the microstructures form a succession of sequences arranged in an axial direction on the steering shaft and/or the device non-positively connected thereto (see column 2, lines 34-54).

As per claim 31, Bridges discloses the sensors are one of optical sensors and magnetic sensors (see columns 5-6, lines 9-27).

As per claim 33, Bridges discloses the coded microstructures are disposed at the other end of the steering shaft, and further including at least one mounting bore in the housing for receiving the sensor (see columns 5-6, lines 9-27).

As per claim 34, Bridges discloses a pair of sensors and an associated pair of mounting bores for receiving respective sensors (see columns 4-5, lines 56-8).

As per claim 35, Bridges discloses steering shaft has respective one and other ends, the pinion comprising a pinion gear disposed for engagement with the rack outside of the pressure chamber and adjacent the one end thereof, the sensor disposed in alignment with the coded microstructures and disposed adjacent the other end of the steering shaft (see columns 6-7, lines 28-3).

As per claim 36, Bridges discloses the other end of the steering shaft extends beyond the pressure chamber, the coded microstructures extend along a length thereof that extends beyond

the pressure chamber, and including seals and respective opposed locations where the rack extends beyond the housing (see columns 5-6, lines 37-27).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-9, 12-15, and 19-22, are rejected under 35 U.S.C.103(a) as being unpatentable over Hipp et al. (5825178).

As per claim 1, Hipp et al. disclose a steering device for vehicles including a steering shaft, the steering device comprising: a sensor for determining the movement of said steering shaft, and a circuit for evaluating the measuring signals of the sensor (see column 3, lines 45-67); coded microstructures disposed on the steering shaft and/or on a device that is connected to the steering shaft in a non-positive manner (see column 4, lines 53-67); sensor positioned for detecting the coded microstructures and outputting an associated measurement signal (see column 3, lines 45-67); circuit receiving the measurement signal and outputting an electronic signal representing a steering condition (see column 5, lines 1-27). Hipp et al. do not disclose coded microstructures having a thickness of 100 nm to 100 μ m. However, Hipp et al. disclose coded microstructures having a thickness of 50 nm (see column 4, lines 15-16), it would have been obvious that the thickness of 100 nm to 100 μ m just a design choice. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teach

of Hipp et al. by combining coded microstructures having a thickness of 100 nm to 100 μ m for designing mechanical structure of the vehicle steering system.

As per claim 2, Hipp et al. disclose the microstructures form a succession of sequences arranged in an axial direction on the steering shaft and/or the device non-positively connected thereto (column 4, lines 53-67).

As per claims 3-4, Hipp et al. disclose each sequence comprises multiple and/or single structures arranged spatially in an azimuthal and/or axial direction and containing individual or block-type coding, wherein the sequences contain bit coding (see columns 1-2, lines 49-31).

As per claims 5, and 7, Hipp et al. disclose a plurality of sequences are combined in a block, the blocks being distinguishable from each other by coding; wherein the microstructures are in complementary form (see column 4, lines 1-53).

As per claim 6, Hipp et al. disclose the sequences arranged in an axial direction are present in redundant form, offset parallel more than once over the periphery of the steering shaft and/or device (see column 3, lines 1-30).

As per claims 8-9, Hipp et al. disclose the lateral dimensions smallest details of the microstructures (see column 4, lines 1-52).

As per claim 12, Hipp et al. disclose the microstructures have a level surface and are levelled by a planarizing method (see column 4, lines 1-52).

As per claim 13, Hipp et al. disclose the microstructures are built up from or covered with tribological hard-material layered systems (column 5, lines 1-27).

As per claim 14, Hipp et al. disclose the hard-material layered systems are single films or multi-layer films of TiN and/or TiAlN and/or TiCN films and/or aluminium oxide films and/or

amorphous diamantine hydrocarbon films with and without metal doping and/or amorphous CN films and/or cubic boron nitride films and/or diamond films (see column 3, lines 30-44).

As per claim 15, Hipp et al. disclose tile sensors are arranged in the form of a line and/or array (see column 3, lines 1-30).

As per claim 19, Hipp et al. disclose the microstructures are in the form of a reflection hologram (see column 4, lines 1-52).

As per claims 20-22, Hipp et al. disclose the sensors are magnetic sensors; the magnetic sensors are in a linear arrangement for reading a multi-bit code, particularly an 8-bit code; the sensor has a reading head with polar structures arranged on an arc matching the diameter of the steering shaft (see column 3, lines 1-30).

6. Claims 16-18, are rejected under 35 U.S.C.103(a) as being unpatentable over Hipp et al. (5825178) in view of Kato et al. (5314036).

As per claims 16-18, Hipp et al. do not disclose optical sensors. However, Kato et al. disclose optical sensors, optical fiberglass, and fibre optical double or multiple sensors (see column 1, lines 10-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teach of Hipp et al. by combining optical sensors for sensing steering movement.

7. Claims 29, and 32, are rejected under 35 U.S.C.103(a) as being unpatentable over Bridges (4848791), in view of Hipp et al. (5825178).

As per claim 29, Bridges does not disclose coded microstructures having a thickness of 100 nm to 100 μ m. However, Hipp et al. disclose coded microstructures having a thickness of 50 nm (see column 4, lines 15-16), it would have been obvious that the thickness of 100 nm to

100 μm just a design choice. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teach of Bridges by combining coded microstructures having a thickness of 100 nm to 100 μm for designing mechanical structure of the vehicle steering system.

As per claim 32, Hipp et al. disclose the microstructures are built up from or covered with tribological hard-material layered systems (column 5, lines 1-27).

8. Claims 23-27 are allowable.

Remarks

9. Applicant's argument filed on 11/12/10 has been fully considered. Upon updated search, the new ground of rejection has been set forth as above.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalena Tran whose telephone number is 571-272-6968. The examiner can normally be reached on M-W (in a first week of a bi-week), and T-R (in a second week of bi-week) from 7:00AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi H. Tran can be reached on 571-272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dalena Tran/
Primary Examiner, Art Unit 3664

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